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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,138	04/02/2004	Mark Wilson	CEDM 8002	1500

321 7590 01/17/2006
SENNIGER POWERS
ONE METROPOLITAN SQUARE
16TH FLOOR
ST LOUIS, MO 63102

EXAMINER

FEELY, MICHAEL J

ART UNIT	PAPER NUMBER
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1712

DATE MAILED: 01/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/817,138

Applicant(s)

WILSON ET AL.

Examiner

Michael J. Feely

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 18-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18-41 is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0604</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I (claims 1-14 and 18-35) in the reply filed on October 18, 2005 is acknowledged. The traversal is on the ground(s) that the Examiner has not sufficiently concluded that groups I and III are distinct.

It appears that the previous Examiner set forth a reasonable analysis of the claims in the Restriction requirement; however, the current Examiner is willing to unite groups I and III because the subject matter is closely related. Hence, claims 1-14 and 18-41 are pending and under consideration.

Preamble Limitations

2. In claims 1-14, the recitation "*for curing an underfill that comprises an epoxy resin and for fluxing a solder during a solder assembly of an electronic component to an electronic device substrate,*" has been given little patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

In the instant case, the preamble merely recites the intended use of the curative, wherein the prior art can meet this future limitation by merely being capable of such intended use.

3. In claims 18-35, the recitation "*for application between an electronic component and an electronic device substrate to assist in solder assembly of the electronic component to the*

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electronic device substrate and to provide mechanical shock resistance and thermal cycling resistance,” has been given significant patentable weight. Although it cites the intended use of the underfill solution, the body of the claim breathes life into the preamble language.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-10 and 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Marshall et al. (US Pat. No. 3,746,686).

Regarding claims 1-10 and 12-14, Marshall et al. disclose: *(1)* a curative comprising a salt that is a reaction product of an imidazole component and a carboxylic acid component having at least 10 carbon atoms per molecule (column 4, line 10 through column 5, line 57);

(2) wherein the imidazole component is selected from the group consisting of imidazole, isoimidazole, and a substituted imidazole (column 4, lines 51-58);

(3) wherein the imidazole component is selected from an alkyl-substituted imidazole and an aryl-substituted imidazole (column 4, lines 51-58);

(4) wherein the imidazole component is selected from an alkyl-substituted imidazole having up to about 17 carbon atoms in the alkyl substituent and an aryl-substituted imidazole having up to about 10 carbon atoms in the aryl substituent (column 4, lines 51-58);

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(5) wherein the imidazole component is selected from an alkyl-substituted imidazole having up to about 8 carbon atoms in the alkyl substituent and an aryl-substituted imidazole having up to about 10 carbon atoms in the aryl substituent (column 4, lines 51-58);

(6) wherein the imidazole component is an alkyl-substituted imidazole component selected from the group consisting of *see claim for list* (column 4, lines 51-58);

(7) wherein the imidazole component is selected from the group consisting of 2-ethyl-4-methyl-imidazole and 1-cyanoethyl-2-ethyl-4-methyl-imidazole (column 4, lines 51-58);

(8) wherein the carboxylic acid component is a monocarboxylic acid having more than 15 carbon atoms per molecule, a dicarboxylic acid having at least 10 carbon atoms per molecule, or a combination thereof (column 4, line 59 through column 5, line 11);

(9) wherein the carboxylic acid component is a monocarboxylic acid having more than 20 carbon atoms per molecule, a dicarboxylic acid having at least 12 carbon atoms per molecule, or a combination thereof (column 4, line 59 through column 5, line 11);

(10) wherein the carboxylic acid component is a dicarboxylic acid having at least 20 carbon atoms per molecule (column 4, line 59 through column 5, line 11).

(12) wherein the salt comprises a weight ratio of the imidazole component to the carboxylic acid that is between about 1:0.1 to 1:4 (column 5, lines 30-40);

(13) wherein the salt comprises a weight ratio of the imidazole component to the carboxylic acid that is about 1:2 (column 5, lines 30-40); and

(14) wherein the curative is substantially free of an anhydride (column 4, line 10 through column 5, line 57: *acid or anhydride is used*).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall et al. (US Pat. No. 3,746,686).

Regarding claim 11, Marshall et al. disclose, "The acid portion of the salt is derived from a polycarboxylic acid or anhydride which contains *from 2 to 20 carbon atoms*. They may be *aliphatic or aromatic, saturated or unsaturated*," (column 4, lines 59-62). they fail to explicitly disclose the species set forth in claim 11.

However, it should be noted that "*a polycarboxylic acid or anhydride which contains from 2 to 20 carbon atoms. They may be aliphatic or aromatic, saturated or unsaturated*" is a relatively limited genus. It would appear that one of ordinary skill in the art at the time of the invention would have recognized the species set forth in claim 11 as suitable carboxylic acid compounds because they fall within this relatively limited genus description.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use *isostearic acid, 5-n-hexyl-2-(carbonyl-n-heptyl) cyclohexene carboxylic acid, or a combination thereof*, in the salt of Marshall et al. because these materials fall within the acid requirements, wherein, "the acid portion is a polycarboxylic acid or anhydride which contains from 2 to 20 carbon atoms. They may be aliphatic or aromatic, saturated or unsaturated."

Allowable Subject Matter

8. Claims 18-41 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter:

Gotoh et al. (US Pat. No. 6,660,943) is the closest prior art. They disclose an underfill composition and method similar to those set forth in instant claims 18 and 36. Their composition is primarily a urethane resin composition with minor amounts of epoxy resin (Abstract; column 5, line 3 through column 6, line 11). They also use a curing agent that includes imidazoles and their salts with carboxylic acids (column 3, line 66 through column 4, line 7). The carboxylic acids disclosed are lower carbon carboxylic acids, and none of these examples have at least ten carbon atoms.

Furthermore, there is no motivation to combine the teachings of Marshall et al. with the teachings of Gotoh et al. because the resin system on Marshall et al. is simply an epoxy system (no urethane), and they fail to distinguish between the high and low carbon carboxylic acids used in their salts. In fact, there appears to be a preference for low carbon content.

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Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is 571-272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael J. Feely
Primary Examiner
Art Unit 1712

January 9, 2006

MICHAEL FEELY
PRIMARY EXAMINER